Chapter 5

**Factor Polynomials**

**Lesson 5-5**

**Study Guide and Intervention**

***Solving Polynomial Equations***

**5-5**

For four or more terms, check for: Grouping

*ax* + *bx* + *ay* + *by* = *x*(*a* + *b*) + *y*(*a* + *b*)

= (*a* + *b*)(*x* + *y*)

For three terms, check for: Perfect square trinomials

*a*2 + 2*ab* + *b*2 = (*a* + *b*)2

*a*2 – 2*ab* + *b*2 = (*a* – *b*)2

General trinomials

*acx*2 + (*ad* + *bc*)*x* + *bd* = (*ax* + *b*)(*cx* + *d*)

For two terms, check for:

Difference of two squares

*a*2 – *b*2 = (*a* + *b*)(*a* – *b*)

Sum of two cubes

*a*3 + *b*3 = (*a* + *b*)(*a*2 – *ab* + *b*2)

Difference of two cubes

*a*3 – *b*3 = (*a* – *b*)(*a*2 + *ab* + *b*2)

For any number of terms, check for:

greatest common factor

**Techniques for Factoring**

**Polynomials**

*Glencoe Algebra 2*

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**9.** *c*4 + *c*3 – *c*2 – *c*

**8.** *x*2 + *x* + 1

**7.** 100*m*8 – 9

**6.** 2*r*3 + 250

**5.** 35*x*3*y*4 – 60*x*4*y*

**4.** *x*4 – 1

**3.** 2*x*2 + 18*x* + 16

**2.** 6*mn* + 18*m* – *n* – 3

**1.** 14*x*2*y*2 + 42*xy*3

**Exercises**

**Factor completely. If the polynomial is not factorable, write *prime*.**

Group to find a GCF.

Factor the GCF of each binomial. Distributive Property

8*x*2 – 14*x* – 15 = 8*x*2 – 20*x* + 6*x* – 15

= 4*x*(2*x* – 5) + 3(2*x* – 5)

= (4*x* + 3)(2*x* – 5)

Thus, 24*x*2 – 42*x* – 45 = 3(4*x* + 3)(2*x* – 5).

First factor out the GCF to get 24*x*2 – 42*x* – 45 = 3(8*x*2 – 14*x* – 15). To find the coefficients of the *x* terms, you must find two numbers whose product is 8 · (–15) = –120 and whose sum is –14. The two coefficients must be –20 and 6. Rewrite the expression using –20*x* and 6*x* and factor by grouping.

**Factor 24*x*2 – 42*x* – 45.**

**Example**

PERIOD

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Chapter 5

**Solve Polynomial Equations**  If a polynomial expression can be written in quadratic form, then you can use what you know about solving quadratic equations to solve the related polynomial equation.

**5-5**

**12.** – 5+ 6 = 0

**9.** 12 = 0

The solution is or 6.

Original equation

Write the expression on the left in quadratic form. Factor.

Zero Product Property

**Solve 2*x* + – 15 = 0.**

*x* = –6

*x* = 6 or

*x*2 – 36 = 0

(*x* – 6)(*x* + 6) = 0

*x* = 2 or

*x* = –2

*x*4 – 40*x*2 + 144 = 0

(*x*2)2 – 40(*x*2) + 144 = 0 (*x*2 – 4)(*x*2 – 36) = 0

*x*2 – 4 = 0 (*x* – 2)(*x* + 2) = 0

*x* – 2 = 0 or *x* + 2 = 0

Zero Product Property

Factor.

Zero Product Property

Simplify.

Original equation

Write the expression on the left in quadratic form. Factor.

**Study Guide and Intervention** *(continued)*

***Solving Polynomial Equations***

*Glencoe Algebra 2*

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**11.** *x* – 10 + 21 = 0

10. *x* – 5 + 6 = 0

**8.** 4*x*4 – 73*x*2 + 144 = 0

**7.** *x*4 – 29*x*2 + 100 = 0

**6.** *y*4 – 5*y*2 + 4 = 0

**5.** *m*6 – 16*m*3 + 64 = 0

**4.** 3*t*6 – 48*t*2 = 0

**3.** *x*4 – 3*x*2 = 54

**2.** *x*4 – 6*x*2 = –8

**1.** *x*4 = 49

**Exercises**

**Solve each equation.**

Since the principal square root of a number cannot be negative, = –3 has no solution.

Simplify.

= –3

= or

2*x* + – 15 = 0

2()2 + – 15 = 0  
(2 –5)( + 3) = 0

2 – 5 = 0 or + 3 = 0

**Example 2**

The solutions are ±2 and ±6.

or

or *x* – 6 = 0 or *x* + 6 = 0

or

or

**Solve *x*4 – 40*x*2 + 144 = 0.**

**Example 1**

NAME DATE PERIOD







